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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/648,884	08/27/2003	Jeffrey C. Hedrick	YOR920030112US2 (16755)	4881
23389	7590	11/04/2005	EXAMINER ANDUJAR, LEONARDO	
SCULLY SCOTT MURPHY & PRESSER, PC 400 GARDEN CITY PLAZA SUITE 300 GARDEN CITY, NY 11530			ART UNIT 2826	PAPER NUMBER

DATE MAILED: 11/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/648,884

Applicant(s)

HEDRICK ET AL.

Examiner

Leonardo Andújar

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 July 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) 14, 15 and 24-43 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-9, 11-13, 18-20, 22 and 23 is/are rejected.
- 7) ☒ Claim(s) 5, 10, 16, 17 and 21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 8/27/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of species 1 (claims 1-13 and 16-23) in the reply filed on 7/22/2005 is acknowledged.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-4, 6-9, 11-13, 18-20, 22 and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Fitzsimmons et al. (US 6,917,108)

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

4. Regarding claim 1, Fitzsimmons (e.g. fig. 3d) teaches an interconnect structure comprising at least one conducting metal feature 214/218 on a substrate 210, the substrate further comprising an interlayer dielectric layer surrounding the conducting

metal feature, a multilayered dielectric diffusion barrier layer that is a barrier to metal diffusion and is comprised of at least two sublayers where at least one sublayer is an air barrier sublayer 213/219 which prohibits air permeation (inherent property of the material) and at least another sublayer 215/217 is a low-k sublayer, and an interlayer dielectric 212 that is comprised of a line level dielectric and a via level dielectric (col. 6/lls. 36-64 & col. 7/lls. 8-14).

5. Regarding claim 2, Fitzsimmons teaches that multilayered dielectric diffusion barrier layer has a composite dielectric constant less than 4.0 (inherent property of the material, SiCOH, col. 7/lls. 8-20).

6. Regarding claim 3, Fitzsimmons teaches that the air barrier sublayer is a dielectric comprised of a silicon nitride (col. 6/lls. 36-63).

7. Regarding claim 4, Fitzsimmons teaches that the air barrier sublayer is a dielectric that has a composition of  $\text{Si}_x\text{N}_w\text{C}_x\text{O}_y\text{H}_z$ . The amount of x is about 0.2 to about 0.34, the amount of y is about 0.12 to about 0.34, the amount of w is about 0.05 to about 0.3, and the amount of z is about 0.2 to about 0.5 (col. 6/lls. 36-63).

8. Regarding claims 6 and 7, Fitzsimmons teaches that the low k sublayer contains porosity wherein the porosity is a cell morphology (inherent property of the material, SiCOH, col. 7/lls. 8-20).

9. Regarding claim 8, Fitzsimmons teaches that the diffusion barrier is a bilayer where the low k sublayer is atop of the air barrier layer (215/213).

10. Regarding claim 9, Fitzsimmons teaches that the diffusion barrier is a bilayer where the air barrier sublayer is atop of the low k sublayer (219/217).

11. Regarding claim 11, Fitzsimmons shows a low dielectric constant material 212 made of silk. Note that SILK inherently has the claimed composition (col. 6/lls. 8-11).

12. Regarding claim 12, Fitzsimmons shows that the low dielectric material is porous (inherent property of SILK).

13. Regarding claim 13, Fitzsimmons shows that the via level dielectric is comprised of at least one low dielectric constant material 212 and the multilayered dielectric diffusion barrier layer.

14. Regarding claims 18 and 19, Fitzsimmons teaches a hard mask dielectric 219 (e.g. SiCNH) that differ in composition from the line level dielectric 216 (col. 6/lls. 9-11 & col. 9/lls. 51-57).

15. Regarding claim 20, Fitzsimmons teaches that the line level and via level dielectrics is separated by a dielectric etch stop layer 213 (col. 3/lls. 24-37).

16. Regarding claim 22, Fitzsimmons teaches at least one adhesion promoter 215 is present between the multilayered dielectric diffusion barrier layer and the dielectrics layer above and/or below the multilayered diffusion barrier (col. 3/lls. 24-37).

17. Regarding claim 23, Fitzsimmons teaches that at least one adhesion promoter 215 is between the sublayers for the multilayered dielectric diffusion barrier (213/217/219).

***Allowable Subject Matter***

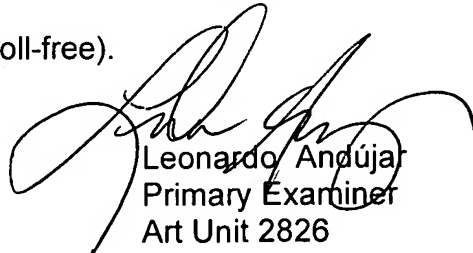
18. Claims 5, 10, 16, 17 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**Conclusion**

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonardo Andújar whose telephone number is 571-272-1912. The examiner can normally be reached on Mon through Thu from 9:00 AM to 7:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Leonardo Andújar  
Primary Examiner  
Art Unit 2826

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